

**REMARKS/ARGUMENTS**

Claims 1, 21, and 47 have been amended with the inclusion of the feature of claims 18, 44 and 54 respectively and now include the feature of a “uniform sized open cells have a cell diameter between 160 to 220  $\mu\text{m}$ ” as is shown in Table 1 of the present application. This cell diameter is a given size (as described in the paragraph bridging pages 5 and 6) helps to allow the entrapment of oil droplets within the pores as well as their release from the coalescing media. The Applicant respectfully submits that this feature of cell diameter size is not found in any of the cited references and does not “constitute a parameter that would have been routinely manipulated/optimized by those skilled in the art” as suggested in the Official Action.

**Rejection under 35 U.S.C. § 103**

The rejection of claims 1 to 7, 9 to 10, 12 to 34 and 38 to 58 is that they do not comply with U.S.C. §103(a) and are obvious in light of the combined teaching of GB 2,083,370 (henceforth GB‘370) and WO 02/20115 (henceforth WO‘115). The Applicant respectfully requests reconsideration.

Although somewhat boldly stated in our last correspondence, the Applicant respectfully submits that the statement made in the GB‘370 application (on page 1, lines 84 to 86) “of removing oil matters, of granules having a particle size smaller than 10 $\mu$ ” must be considered, at best, an overstatement and at worst, incorrect. The Applicant submits and the Examiner must concede, that as the diameter of oil droplets approaches 0 $\mu\text{m}$ , the droplets will have a greater and greater tendency to stay in suspension for longer periods of time for a variety of factors, including the Brownian motion of the continuous phase.

Furthermore, the argument presented in the Official Action of March 21, 2008, suggests that the combination of GB‘370 and using the known absorbent of WO‘115 would have been an obvious combination. The Official Action seems to suggest this combination would attain the levels of separation suggested in GB‘370. The Applicant respectfully submits that the performance of such a combination would, if

the teachings of GB'370 are to be believed, depend on whether the "water-insoluble hydrousgel" of GB'370 was applied to the absorbent material of WO'115. If the absorbent material of WO'115 without the hydrousgel of GB'370 was used than the performance claimed in WO'115, of trapping oil particles of 2 $\mu\text{m}$  or more would be expected, not the "smaller than 10 $\mu$ " claimed in GB'370. The geometrical arrangement GB'370 alone does not afford the alleged performance but requires the assistance of an absorbent material including a water-insoluble hydrousgel to attain the "smaller than 10 $\mu$ " efficiency.

The Applicant submits that T. Frankiewicz presented a paper entitled "Understanding the Fundamentals of Water Treatment, the Dirty Dozen, -12 Common Causes of Poor Water Quality", at the 11<sup>th</sup> Produced Water Seminar, Houston, Texas, (January 2001). This paper included a table (enclosed with this submission) outlining the treatment equipment to be used based on the particles that needed to be removed, and it is submitted that this table would likely be considered a part of the common general knowledge in 2001. We note that in 2001, despite the teachings of GB'370 (published in 1982), Mr. Frankiewicz (who at the time of the paper was a V.P., Process Solutions, for the Natcogroup) was likely a skilled person, considered the particle removal efficiency of a mesh coalescer and a media filter to be ONLY for particles greater than 5 $\mu\text{m}$ . The Applicant submits had the GB'370 reference successfully treated particles smaller than 10 $\mu$ , a paper presented nearly twenty years later, would likely have included this information, which is not the case. The Applicant submits that in 2001 (before the priority date of the present application) the general knowledge suggested that only particles greater than 5 $\mu\text{m}$  could be separated by a mesh coalescer and a media filter, and not particles smaller than 10 $\mu\text{m}$ .

Therefore, if the performance of combined apparatus of GB'370 and WO'115 are compared to that of the present invention two scenarios for oil droplet separation are possible. In the first scenario, particles smaller than 10 $\mu$  are separated with a combined water-insoluble hydrousgel on the absorbent material of WO'115. In the second scenario, only the absorbent material of WO'115 is used and must be understood to trap oil particles of 2 $\mu\text{m}$  or more.

The claims on file as presently amended in the present application, include an important feature of "uniform sized open cells with a cell diameter of 160 to 220 $\mu\text{m}$ ". This feature is not found in either of the cited references. This feature allows the present invention to substantially surpass the performance of the absorbent material of WO'115 by trapping particles of 0.5 $\mu\text{m}$  or more.

The first scenario of combined references GB'370 and WO'115 includes a hydrousgel not found in the present claims or specification, while the second scenario (without the hydrousgel) would produce a separation inferior to that of the present application. The improved separation efficiency of the present application over that of WO'115 is 4 x 4 or 16 times better than WO'115. This improvement in performance is based on the porous mass' ability that helps to allow the entrapment of oil droplets within the pores as well as their release from the coalescing media. This advantage is not taught or suggested by either reference alone or in combination.

Therefore, the Applicant respectfully submits that the claims presently in the case that include the feature of uniform cell size diameters in the independent claims is not taught by the prior art and produces a surprising advantage not found in the prior art in general, that is of trapping oil particles of 0.5 $\mu\text{m}$  or more. The Applicant respectfully requests reconsideration.

Voluntary Amendment to the Dependencies in the Claims

The Applicant has voluntarily amended the dependencies in claims 15, 17, 19, 43, 45, 57 and 58 such that they now depend from either independent claim 1 or 21 and not from a claim that has been cancelled.

Conclusion

The Applicant respectfully submits that the claims presently on file are in condition of allowance and favourable action is earnestly solicited.

Respectfully submitted,

Pierre T. A. Nguyen, Reg. No. 55,043  
Customer No. 020988  
OGILVY RENAULT LLP  
Tel.: (514) 847-4259

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Date

Enclosure: Table from T.Frankiewicz "Understanding the Fundamentals of Water Treatment, the Dirty Dozen, -12 Common Causes of Poor Water Quality", 11<sup>th</sup> Produced Water Seminar, Houston, Texas, (January 2001)

**PARTICLE SIZE REMOVAL CAPABILITIES**

<b>Technology</b>	<b>Removes Particles Greater than Size Indicated (in microns)</b>
API Gravity Separator	150
Corrugated plate separator	40
Induced gas floatation without chemical addition	25
Induced gas floatation with chemical addition	3-5
Hydrocyclone	10-15
Mesh coalescer	5
Media filter	5
Centrifuge	2
Membrane filter	0.01